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Drexel University
Philadelphia, Pennsylvania

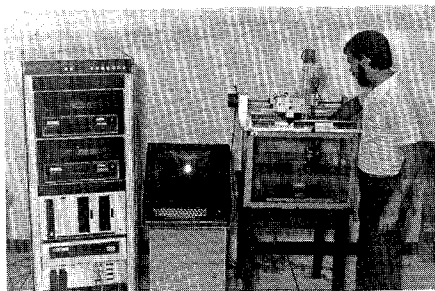
Drexel University Philadelphia, Pennsylvania

Drexel University, located in the University City section of Philadelphia, PA, has an enrollment of approximately 15 000 students, including over 3000 graduates. Most students who attend the day and evening colleges at Drexel are enrolled in the colleges of Engineering, Science, and Business Administration. On the undergraduate level, Drexel is a fully cooperative institute, combining liberal arts with its technical studies.

For senior engineering students, formal courses in general NDT and ultrasonics (including design courses), are offered to combine class hours with hands-on laboratory experience. Many undergraduate students also work on sponsored research programs in Drexel's NDT laboratories during their co-op periods. At the graduate level, NDT courses are offered in ultrasonics, wave propagation, and signal processing. Most graduate courses are offered one evening per week. Advanced equipment is utilized in much of the course work.

Sponsored research programs in areas related to NDT are currently underway in the Departments of Mechanical Engineering, Bioengineering, and Physics. These programs employ master of science and Ph.D. students whose dissertations can be written on subjects sponsored by various government agencies and industries. All full-time graduate students in engineering and the sciences participate in sponsored research during their academic careers.

The NDT and composite materials laboratories of the Department of Mechanical Engineering and Mechanics are involved in three primary areas of NDT research: ultrasonics, acoustic emission, and x-ray radiography. In the areas of ultrasonics, Drexel's computer-based ultrasonic data acquisition system utilizes a computer-controllable flaw detector, transient waveform digitizer, and a programmable scanning tank. Research efforts in ultrasonic NDT are directed toward flaw classification, utilizing feature-based methodology and pattern recognition. This is applied in the current re-



Graduate student Bruce Nestleroth sets up a computer-controlled scan system for feature mapping of a structure.

search projects on defect detection using feature mapping and flaw classification in adhesive bonding, composite materials, medical ultrasonic tissue classification, offshore structures, weld damage in K-joints, stress corrosion cracking, and welding defects. Also included in the research activities are transducer design for various applications and design of microprocessor-aided controlled systems.

The acoustic emission studies concentrate on detection of damage initiation and progression in resin matrix and metal matrix composites. Emphasis is placed on the detection capabilities of acoustic emission instrumentation of nonvisual damage, detecting and tracking damage initiation and progression in composite systems under various loading condi-



I. M. Madhukar, a graduate student at Drexel, acquires acoustic emission data from a composite material specimen.

tions, and determination of materials quality and fabrication inhomogeneities. The AE instrumentation is interfaced with data acquisition systems for post-test analysis. X-ray radiography is routinely applied in analytical and experimental studies on basic failure mechanisms in composites.

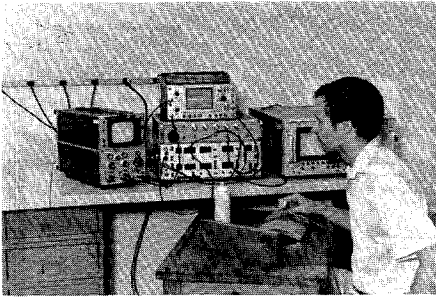
Both the ultrasonic NDT laboratory and the composite materials laboratory are tied to the department's mainframe computer, which can also be used for signal analysis and number crunching. Also connected to this computer are three CAD/CAM stations accessible to students. Starting in the 1983-84 academic year, every incoming full-time freshman will be required to purchase a computer to be used in course work.

NDT activity research is supported by the Air Force Office of Scientific Research, Office of Naval Research, Naval Air Development Center, Air Force Materials Laboratory, NASA, U.S. Mineral Management Service, other government agencies and laboratories, and private industry.

The Departments of Civil Engineering



Shown is a section of an offshore K-joint used in acoustic emission, vibration, and ultrasonic studies at Drexel.



Mike Neary, one of 15 000 students enrolled at Drexel University, searches for defect data in a welded structure.

and Physics join hands in applying various remote sensing techniques to detect and delineate buried drum distributions

in soil and under water. NDT techniques such as ground probing radar, magnetometers, and electromagnetic induction methods are used. Acoustic emission is also applied in this area to detect instability in geological masses such as earth and dams and to determine stress history in soil and rocks.

A research group from the Department of Computer and Electrical Engineering and the Department of Bioengineering is active with ultrasound and ultrasonic medical imaging. Research areas include signal processing of ultrasonic echoes to estimate grain size in man-made materials and disease states in living tissues, characterizing the size of flow suspended particles and bubbles using an ultrasound doppler, and improving

flaw visibility through the reduction of grain noise.

For further information about an academic career in NDT at Drexel University, contact: Joseph L. Rose and Jonathan Awerbuch, Department of Mechanical Engineering and Mechanics; Robert Koerner, Department of Civil Engineering; Art Lord, Department of Physics; and V. E. Newhouse, Department of Computer and Electrical Engineering. Undergraduates and graduate students interested in applying to any of the Drexel programs should contact the Office of Admissions, or the individual faculty members named, at Drexel University, 32nd and Chestnuts Sts., Philadelphia, PA 19104, phone (215) 895-2000.

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